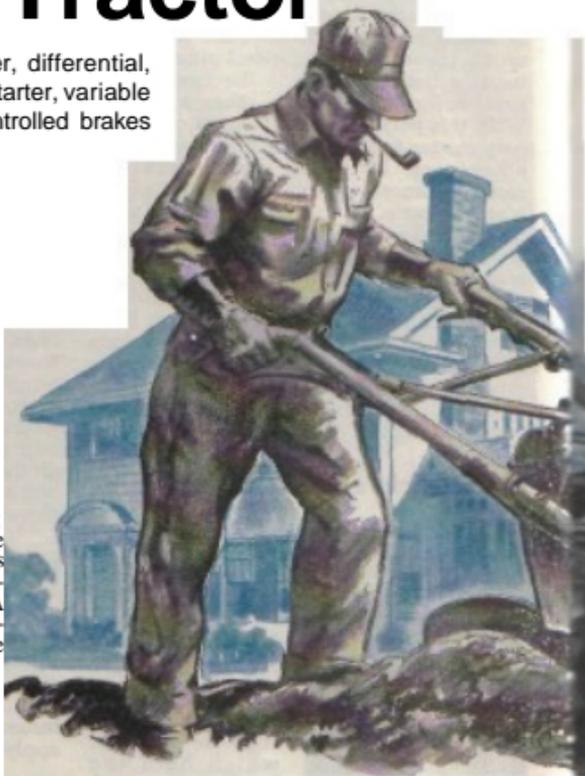


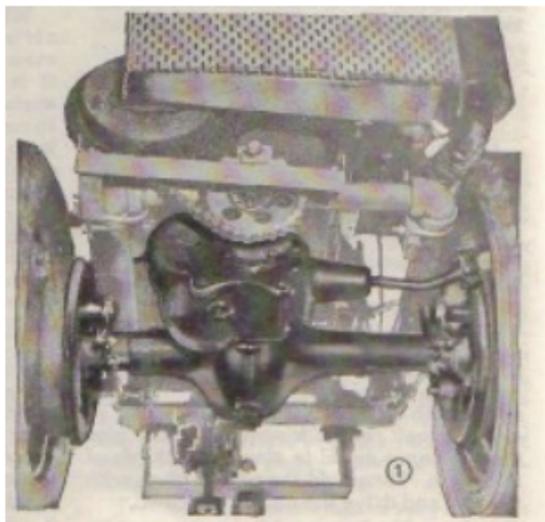
Garden Tractor

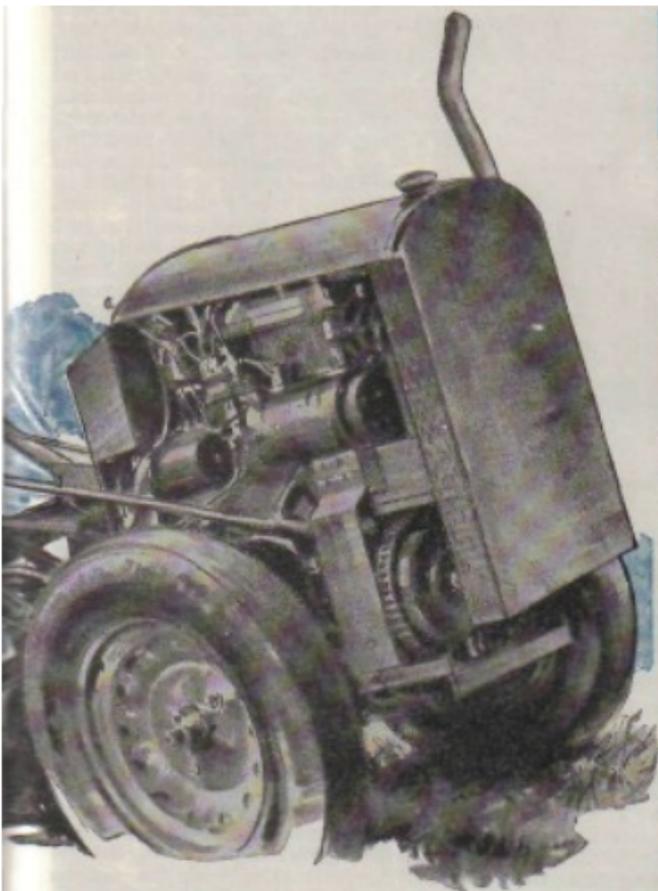
has 4-cylinder power, differential, dual transmission, starter, variable tread and hand-controlled brakes

BBUILT from a few pieces of pipe, pipe fittings and old auto parts. Including the engine, this powerful garden tractor handles all the larger garden-tractor implements such as a 10 or 12-in. turning plow, 5 or 6-ft. disk harrow, any of the larger cultivators, mowing machines, etc., with plenty of power left over for the hard pulls. Because of its extra weight and compact-unit construction it's easy to handle even on the heaviest jobs. Stability and balance plus a close throttle control make it easy to steer and prevent whipping of the handles so common on the lighter garden tractors. Controls are located on the handle bars within easy reach of the operator. A heavy perforated steel grille protects the radiator core from damage in case you bump into something. Handles and frame are one unit, built up from pipe and fittings. Power is taken off the front end of the engine crankshaft by roller chain to a Harley-Davidson motorcycle transmission which contains an "over-center" clutch controlled by a lever on the handle bars. From this transmission, power is taken by roller chain to a second transmission, the latter from a Ford Model-A or 1931 Dodge automobile. This second transmission is bolted directly to a cut-down Ford Model-T rear axle as you see in Fig. 1. The "worm's eye" view in Fig. 1 gives a clear idea of the compact, efficient drive. Sounds like a cranky job to assemble, but it happens that these parts fit together with the minimum of alteration. In the process the drive pinion of the rear axle is "transplanted" to the transmission and then the two parts are "telescoped" together. A study of the exploded view in Fig. 2 will give you an idea of how these various parts are assembled. No dimensions are given on any of the parts except the size of pipe used for the frame.



The "worm's eye" view below shows the drive. Transmission is bolted directly to the differential housing of a Ford Model-T rear axle. Brakes and hubs are from a Ford Model-A axle





This whole job is of such a nature that size of the parts must be determined as you go along. Much depends on what you will use the tractor for, what engine you use, whether 1931 Willys auto engine, as was used on the original, or the popular Willys Jeep engine, now so readily available. Due to variations in the mounting brackets on the Jeep engine alterations must be made from the original plan of assembly. This is not at all difficult, but will make material differences in the dimensions of certain parts.

The first thing to determine is the distance, measured both lengthwise and across the width, of the engine mounting brackets. Distance across the width of the Willys auto engine used in the original tractor was cut down to approximately 16 in. This done, you remove the clutch assembly and the clutch housing. Then make a sling from light chain and fit the chains with hooks attached to the engine in such a way that when it is raised with a tackle block the engine will hang level. Now you're ready for the rest of the job.

It's a good idea to get all the necessary material at hand before you begin work. For the handle bars you need two pieces of 1/4-in. pipe of the grade known to the trade as "extra heavy," also one piece approximately 15 in. long for



Plowing snow is another of the many jobs you'll find for this versatile and powerful tractor. With this rig it works equally well as a pint-sized bulldozer for dirt moving.

the front member. Over-all width of the frame when assembled is 17 in. In addition, two 90-degree elbows, two 45-degree elbows, two 6-in. nipples and two caps are required. Then for the engine supports you require three pieces of flat steel $3/8$ by 4 by 20 in. and one piece $3/8$ by 4 by 22 in. long. These dimensions make considerable allowance. In addition several pieces of angle iron are needed for bearing supports, axle brackets, etc.

Next, you work on the axle assembly, shown in the lower detail, Fig. 2. Tread of the original tractor with the furrow wheel reversed was 34 in. However, the tread width depends on the work to be done with the tractor. If, for example, you plan to cultivate multiple rows of such garden truck crops as carrots or onions, then the tread

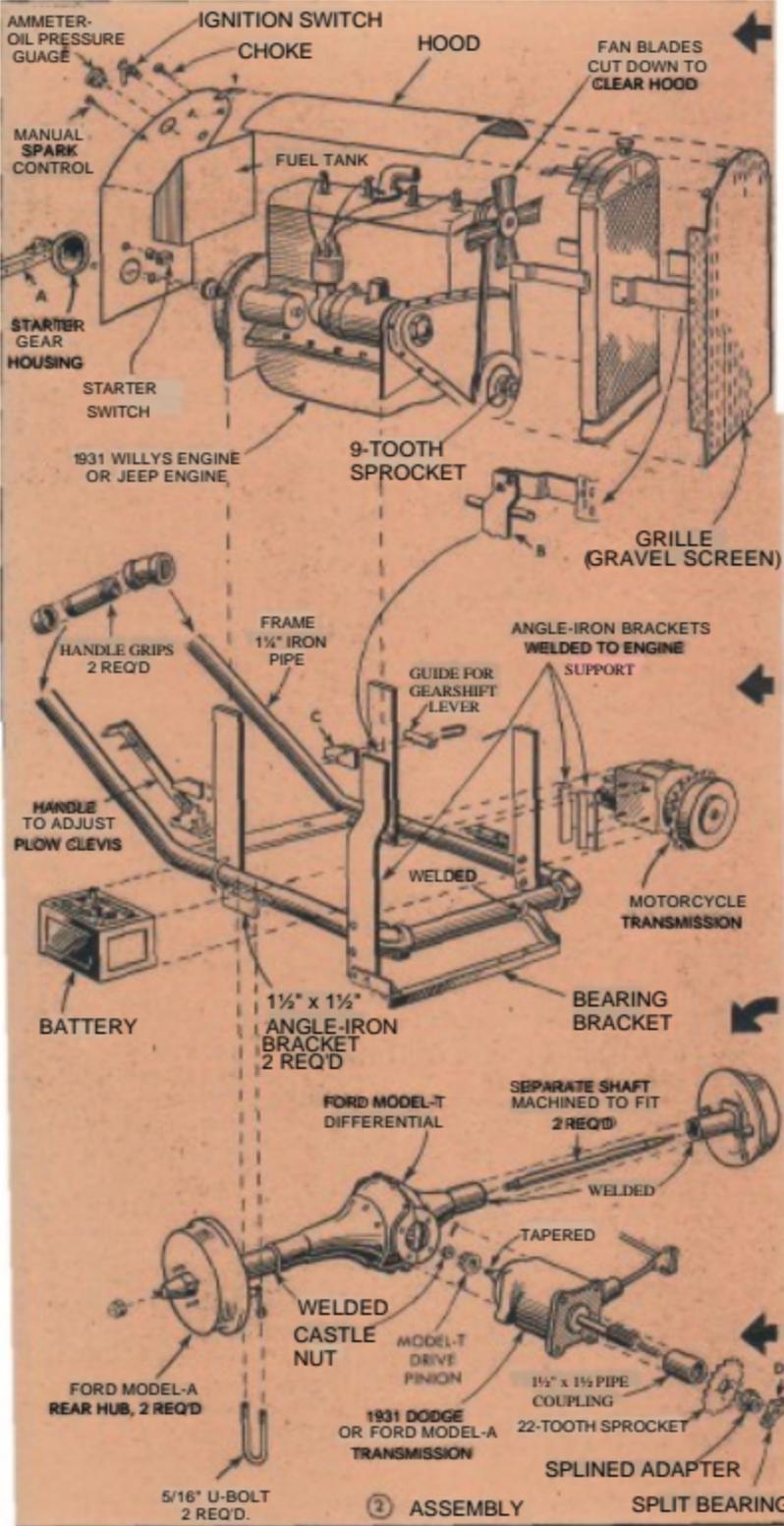
width with the wheels "in" must be planned accordingly. Either way, cut up two axle assemblies to make one. You'll require one Ford Model-T rear axle complete and one Ford Model-A axle. Then, with the tread width required in mind, cut up the axle housings and reassemble the parts as shown in the lower view, Fig. 2. Machine separate axle shafts. This is a job for the local machine shop, unless, of course, you have equipment. The Model-T drive pinion and bearing are removed from the differential assembly and the pinion is mounted on the transmission as in the lower detail, Fig. 2. To do this it will be necessary to disas-

semble the transmission, machine a taper on the transmission shaft, also cut a thread and drill the shaft transversely for a castle nut and cotter pin. Then, to reassemble, first make a paper template of the form of the Model-T propeller-shaft mounting boss and from this scribe four evenly spaced holes on the driven end of the transmission case, keeping in mind that the transmission is turned 90 degrees as in the lower detail, Fig. 2, and also in Fig. 1. Discard the retainer ring for the end ball bearing and also the $1/8$ -in. spacer where the main shaft telescopes into the driveshaft. This allows the end bearing to seat flush with the end of the case. Make a washer of thin sheet metal to hold the bearing in place. Drill $.328$ " clearance holes in the transmission case. Reassemble the main shaft and bolt the transmission case directly to the differential housing, using $5/16$ -in. studs, tightening nuts from inside the case. Check clearance of the pinion. It may be necessary to shim between the two parts. Then cut off the end-plate flange and

weld on a $1/4$ by $1\frac{1}{2}$ -in. pipe coupling, shown separately in Fig. 2. Cut off the transmission lever to about 8 in. long and weld on a ball-joint fitting taken from a Model-T tie rod. Later a suitable ball end is welded to the lower end of the gearshift lever which extends to the handle bars.

Assemble the frame and handle-bar unit, making a 30-degree bend in the long lengths of pipe, the bend 24 in. from the end on both pieces. Bolt the engine supports in place with $5/16$ -in. U-bolts. Block up the axle and frame assemblies in their relative positions under the suspended engine. Lower the engine into position and clamp or otherwise hold the parts in place. With the setup at this stage you can easily determine the location of the first transmission which bolts to one of the engine supports as in the center detail, Fig. 2. Also the location of the bearing support A, the amount of the bend in the engine support B and the location of the bracket pieces C to which the bearing support A is welded. This bearing takes the power takeoff shaft and is optional equipment. Also the position of the axle brackets shown in the center detail, and the bearing bracket which supports the bearing D. Mark the locations of all these parts. Support pieces are welded to the engine brackets and the other parts are either welded or bolted in place as shown.

Use 16-gauge sheet metal for the hood and instrument panel and also the fuel



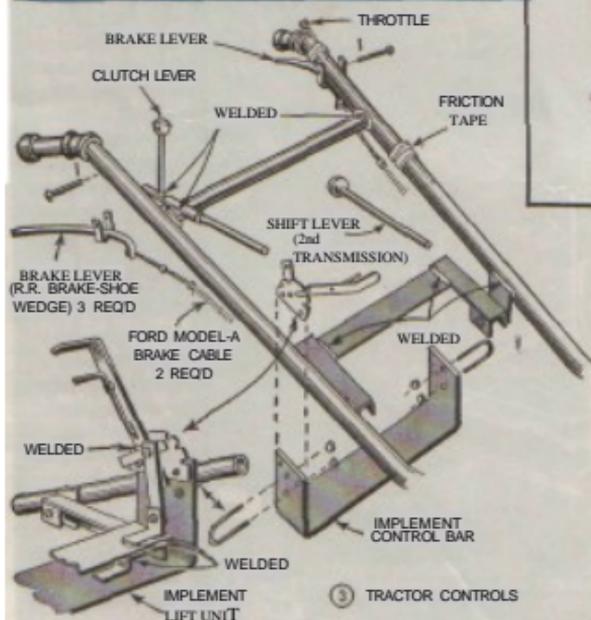
The power plant complete—conventional 4-cylinder auto engine with starter, lights if you want them, and the usual complement of radiator, heavy protective grille, fuel tank, instrument panel and hood—all assembled into one self-contained unit. . .

which is welded to the standing supports of the frame unit. The latter includes the first transmission as shown. Standing supports are U-bolted to the main frame. This manner of assembling permits easy removal of the power unit if necessary.

Right and left braking and differential action are essential to easy operation of a "walking" tractor. This composite axle has all three features. The brakes are sufficiently powerful to lock either wheel at full load and are finger-tip controlled from the handle grips

The second transmission and the axle assemble into one unit which is D-bolted to the frame in such a position that there is just enough weight at the rear to tip the tractor back on the handles when it's in the level position.

② ASSEMBLY SPLIT BEARING



and attach the controls, ignition switch, oil-pressure gauge and ammeter, and wire to the battery. Increase the engine oil pressure to the maximum. Fit the carburetor with an air cleaner. Fuel feed to the carburetor is by vacuum tank, although of course a fuel pump can be fitted. Note in detail B, Fig. 2, the sleeve welded to the engine support. This serves as a bearing for the lower end of the clutch lever, which is a 1/2-in. rod with a short length of gear-shift lever welded on at an angle as you see in Fig. 3. A short arm welded to the clutch lever

tank, which is welded to the panel as indicated. The starter-gear housing is a domed cover from a discarded gasoline pump, and is welded over the hole cut in the panel. In most cases the fan blades must be cut down to clear the hood. Radiator used on the original tractor was taken from a 1931 Willys automobile and cut down in width. Have this done by a service shop. It's also necessary in most cases to straighten the top hose connection. Do this by cutting diagonally and then soldering together to make a straight connection.

Finish the assembly by fitting sprockets as indicated and hooking up the drive chains. Bolt the grille and hood in place

at the lower end connects to the clutch throw-out arm on the motorcycle transmission-clutch assembly by means of a short link bent from a piece of 1/4-in. steel rod. Weld in a cross member about 8 in. below the handle grips to serve as a stiffener, Fig. 3. Balance of the detail in Fig. 3 is more or less optional and must be arranged to suit the implements you will use. A rubber-tired caster wheel is fitted at the center of the implement-control bar to carry the weight of certain other implements and serve as a rest when the tractor is standing idle. Use Ford wheels on the Model-A hubs. Other wheels can be used but likely it will be necessary to lengthen the studs.